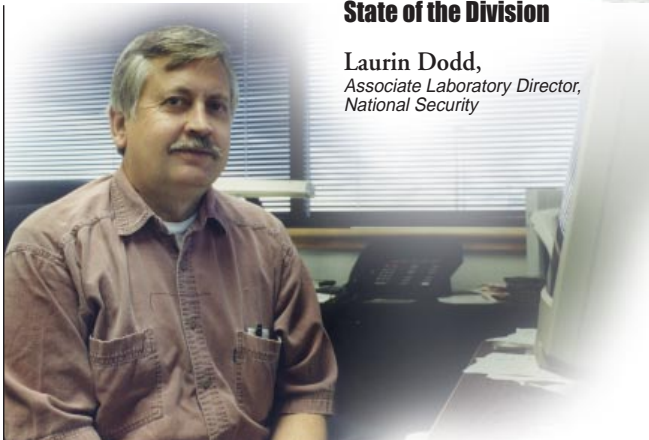


NEED TO KNOW

a national security newsletter

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State of the Division

Laurin Dodd,
*Associate Laboratory Director,
National Security*

Welcome to our second National Security Division newsletter. Highlighted in this issue is a program that has been important to the success of our Division. ASOC is an excellent example of INEEL's integrated capability to successfully develop and deploy complex engineered systems in real-world environments. This issue also recognizes other employee achievements,

including first place in DOE's Bright Lights and Energy@23 awards. We take considerable pride in the contributions of the INEEL staff who have made National Security programs so successful.

An important highlight for the Division since our last newsletter was the receipt of

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The AN/TSQ-209 – In Command and in Control

The ground troops, the foot soldiers, slowly advance through hard-won terrain. Their objective is a not-too-distant town; the barrier – a column of enemy tanks. They radio for air support. Minutes later, swooping down like the cavalry of old; an Air Force A-10 Warthog takes out the tanks with precision and coordination. The troops continue to advance.

Today this is an exercise. But the men and women on the ground and in the air are professionals and they conduct the exercise with rigor. Tomorrow, they know it could be for real. The troops are testing the newly automated close-air-support tool of the U.S. Air Force Air

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The AN/TSQ-209 is a mobile, extremely flexible, command-and-control unit configured for rapid field deployment.



INEEL
Idaho National Engineering & Environmental Laboratory

Command *(continued from page 1)*

Support Operations Center, the AN/TSQ-209 Communication Central. This system was designed and deployed by the National Security Division's Integrated Defense Systems.

The Air Support Operations Center or ASOC is an Air Force unit collocated with the Land Component Commander, responsible for managing air assets in support of ground maneuver. The AN/TSQ-209 automates processing of air-support requests from Army

maneuver units in the field, transmits the information to Army, Navy and Air Force battle management systems and responds back with the action plan. The AN/TSQ-209 is a mobile, extremely flexible, command-and-control unit configured for rapid field deployment. It provides the Air Forces Commander with the capability to plan, direct and control air operations and coordinate these operations with ground, naval and coalition forces.

In World War II, or even 20 years ago, it didn't work this way. Bob

Hibbard, project engineer on ASOC, explains: "Years ago, someone in a jeep would radio in, giving their position and position of the target. Trouble was, the enemy could triangulate radio signals, locate this soldier, maybe killing him and his fellow troopers. Also, if he needed to coordinate with a number of people, it took time, and under pressure of battle, there was no guarantee that the information stayed the same with each call."

"The AN/TSQ-209 computerizes and modernizes this process."

Military Today

Today, the great grandson of that World War II trooper is an Airman using a 10- by 8-inch digital communications terminal to request close air support. This transmission is sent to the ASOC and the Army via secure digital bursts. The Army, given the right resources on hand, might choose to respond. If so, this information goes back to the requester.

Every day, the ASOC receives Air Force resource information from the Air Operations Center. The information includes what aircraft are available, carrying what armament, locations and plans. If the Army cannot respond, ASOC has the information to match a request with a resource. And all of this can take place in minutes.

The key to this whole operation is also indicative of the changing nature of U.S. military battle management. Historically, each branch of the military maintained their own AOR or "area of responsibility". For example, the Army advancing in one AOR, the Marines establishing a beach head in an AOR miles away and the



Airmen undergo vigorous training on the AN/TSQ-209 before system deployment (above). ASOC project engineer Bob Hibbard describes the system to visitors from the Department of Defense, Special Operations Command.



Navy providing air cover for themselves as well as potentially for the Marines. Separate operations, separate communications.

Not so today. Battle management is integrated and coordinated more fully.

The Department of Defense recently approved new defense-wide command-and-control software for air resource management. Developed by Lockheed Martin, the Theater Battle Management Core Systems replaces the Contingency TACS Automated Planning System or CTAPS.

Command-and-Control

INEEL engineers and programmers have just a little bit of experience with military command-and-control systems. Beginning back in 1985 with the Contingency Support System requested by the Tactical Air Command, the INEEL developed and fielded a series of command-and-control systems, including the monumental CTAPS. That system alone generated over a million lines of code. ASOC is descended from a long line of successful military systems.

"We worked very closely with Lockheed Martin Missions Systems in Colorado," says Cheryl Wilhelmsen, ASOC project manager. "Once we proved the principle that what we designed worked, we prototyped and tested it. Lockheed Martin then did the production."

Even though Lockheed Martin manufactures the INEEL-designed systems, the INEEL does the finish work and fields the AN/TSQ-209s. During production, the Air Force set a requirement for faster communication speed. Both the military and the contractor found it more efficient for the INEEL to design and upgrade the communications and prepare it for deployment. The INEEL team also trains the military users on the TBMCS software as it relates to ASOC



An airman checks system configuration (left and above). The units are remarkably flexible and use much commercial off-the-shelf hardware. When industry presses on, upgrades are easy.

operations, system administration and hardware maintenance.

"It was easier if we just did it," says Hibbard speaking of the testing and finish work. "We don't want to get all the way to Korea and find out that it doesn't work."

The INEEL hosts a regular contingency of airmen, officers and civilians for scheduled training sessions. The students travel to Idaho for up to several weeks, learning the systems inside and out. Once the INEEL deploys the systems, an INEEL team travels to the military base

and completes the training that can't be done in Idaho, and participates in field exercises.

"Our customer likes it this way. It's less expensive and more efficient for the Air Force," says Hibbard.

So far, the INEEL has fielded six units, two each at Shaw Air Force Base in South Carolina, Fort Hood in Texas and Sullivan Barracks in Viernheim, Germany. Six more are in the works for 604th ASOS at Camp Red Cloud in Korea, 111th ASOS at Ft. Lewis, Washington and for the 182 ASOS Unit in Illinois.

"Leap-frogging"

Each base receives two units for tactical "leap-frogging". One AN/TSQ-209 could be deployed and as the troops advance, the second would follow the maneuver units as the corps moves forward and become the primary unit. The systems are considered deployable

worldwide with heating and air-conditioning adjustable to any site condition.

The units are also remarkably flexible and use much commercial off-the-shelf hardware. "When industry presses on, we can upgrade easily," says Hibbard. "There is very little fixed wiring, we can modify it at a drop of a hat."

The INEEL has experienced great success with ASOC and the AN/TSQ-209. Major field operations have gone without a hitch. But Hibbard attributes a lot of this to the quality of the troops. "When the troops are so motivated to learn, you can hardly fail."

The success to date hasn't dimmed the enthusiasm or efforts of the INEEL team. They continue to conduct training even as some members prepare to leave for Korea. They have six more units to deploy, with the plan to have them all in the field by the end of April. The job then continues with field support, delta training and new designs and upgrades to the systems.

Advanced Technology Systems

"Ideas that propel the Lab into the future"

Larry Freeman has a perspective of the INEEL and National Security available to few employees. Freeman returned to the INEEL after a four year absence to see freshly the changes within the Laboratory.

Freeman worked in arms-control and intelligence programs from 1992 to 1996 before returning to active duty in the Air Force. Then

just last June, Freeman replaced Harry Sauerwein as Director of Advanced Technology Systems. "When I was last here, National Security programs were a small increment of the business at the INEEL and didn't fit into the long term plan," says Freeman. "Now National Security has been elevated to a Division and is clearly one of DOE's and the INEEL's key missions."

"This is good for the future of the Lab. The focus is changing from environmental cleanup alone to research and development. EM requirements will be satisfied at some time but there will always be new national security requirements."

According to Freeman, national security programs are now

interpreted much more broadly than just the physical defense of borders and classified projects conducted behind closed doors. They now include critical infrastructure protection and energy needs. This entails working across all of the divisions of the INEEL.

"If you look at the Site as a whole, you see that nearly every major operation contributes to national security, certainly ATR, NRE, INTEC and SMC."

What we have

Freeman points out that the Advanced Technology Systems Directorate alone runs the gamut of national security programs. The organization covers topics ranging from power distribution and

control to state-of-the-art software development to nonproliferation and intelligence projects.

"What I want to do is grow this organization, reach out for new customers using the incredible strengths we currently have." He points to examples in the energy sector and critical infrastructure and the years of experience the INEEL has with its own power grid. "We're now using LDRD funding to apply this expertise in developing tools that generate new external customers. We're already making contributions to the preparations for the Salt Lake Olympics in this area."

Another example Freeman uses is the Idaho Accelerator Center located at Idaho State University. "Our own Dr. James Jones is an associate director and this creates

Advanced Technology Systems conducts a variety of projects at the Idaho Accelerator Center located at Idaho State University (below).



Larry Freeman
Advanced Technology Systems



a nice relationship between the INEEL and the university.”

Along with ISU, Advanced Technology Systems runs a huge variety of projects at the Center — testing electronic circuit boards for a computer company, developing tools for detecting materials which may be smuggled in cargo containers and examining fatigue in metal components of critical systems. The Directorate also has programs that support environmental cleanup, including a recent project that may have application to the INEEL’s number one initiative, subsurface science.

“We already have Sandia, Los Alamos and commercial customers coming to the Center to do work. We want to further exploit the capabilities of the Accelerator Center for the benefit of the INEEL and ISU. It’s truly a unique facility.”

Freeman also points to the infrastructure that sets the INEEL apart from the other labs and makes Idaho very attractive to customers. The Site’s remote location combined with the major operations facilities puts researchers in a great position when proposing projects that can’t be done easily at other labs.

“We have an operating reactor and people with the right knowledge and the right clearances to work on the projects. We have classified office and laboratory space. And we have just occupied the new classified Materials Science Laboratory at CFA — further evidence that the INEEL is making significant investments in national security.”

Rule of Ten

Freeman wants all employees, not just those in his Directorate, to know that he, and the whole Division, welcome and want ideas. Virtually every program landed started with an idea. Employees have to think as they execute work day to day — where can they take this concept and apply it.

“We have to keep in mind the well known ‘Rule of Ten’. Out of one thousand ideas come one hundred that are worth considering. Out of those one hundred, there are ten worth investing time and money. And out of those ten is the one significant concept. But if we don’t get the thousand, we don’t get that one big one. It is ideas that will propel the Laboratory into the future.

Technologies originally developed for national security programs have applications in other truly diverse areas. In one example, researchers developed a technology to detect small changes occurring in a scene. They are now considering applications in the medical field, how to use it to detect changes in radiography for dentistry and mammograms.

Another example occurred last summer with the Portable Isotopic Neutron Spectroscopy or

PINS system. PINS was developed and has been applied many times as a nonintrusive technique to assess munitions when the contents were unknown. Last August, PINS was applied to assess the contents of an old, rusted cylinder found near INTEC. It marked the first EM application of this very successful national security technology.

Intelligence — policy — technology

One of the Directorate’s internal initiative areas is intelligence analysis and policy support. Freeman wants to exploit a cycle that starts with intelligence collection and analysis. The finished intelligence products are folded into the establishment of national policies. These policies in turn drive technology requirements.

“We have traditionally focused on the technology development phase of this cycle. We also need

to support the intelligence analysis and the policy development phases. We need to support the policy arms of the DOE, the State Department and the DoD. If we do this, we’ll better understand the technology requirements, and we will be better able to exploit that understanding.”

“I would say that the Laboratory has a different character than when I was here in the nineties. My perception is there is more of a focus on where we are going. There is more of a commitment and vision of how we are going to progress from EM to a broader R and D view. Advanced Technology Systems is in an enviable position of conducting research aimed at solving big problems and executing projects that do that right now. We want to do more and we always want to do it better.”



Developed to assess munitions contents, the PINS system was recently used to identify contents of an old, rusted cylinder found near INTEC. This was a clear EM application of a national Security technology.

Way to Go!

The Department of Energy announced that Bechtel BWXT Idaho, LLC, exceeded performance for the six-month period ending Sept. 30, 2000. Under the Program Execution Guidance (PEG) Performance, DOE's report concluded: "BBWI satisfactorily met all PEG milestones and measures. Performance on three PEGs in the areas of Institutional Planning, **National Security**, and Tech Transfer/Work For Others were determined to be outstanding."

On an individual basis, these National Security employees and program contributors have also been recognized by their customers and others.

From Lt. Col. Christopher M. Ross, U.S. Army, Product Manager for Non-Stockpile Chemical Material regarding Bob McMorland:

"...The Pine Bluff Munitions Assessment System is technically complex and vital to the Department of Defense Chemical Demilitarization Program. Your fine efforts reflect credit upon yourself, Product Manager for Non-Stockpile Chemical Materiel, and the United States Chemical Demilitarization Program."

From Lt. Col. Tom Dunham, Defense Threat Reduction Agency, Arms Control Technol-

ogy Project Manager regarding Dale Kotter:

"We have reviewed the final report (Votkinsk Study) and thank you for the high quality product...Thanks again for your superb work on this project."

The Department of Energy honored an INEEL team of chemists, including National Security contributor Dr. Eric Peterson, for a technology that demonstrates the DOE's commitment to save money and improve the quality of life for consumers. INEEL's lithium battery solid electrolyte topped a list of over 100 technologies nominated by the DOE laboratories for two special awards, receiving first place in both

Energy@23 and Bright Light categories. This technology was developed, in part, for a National Security project sponsored by DOE's Office of Defense Nuclear Nonproliferation.

Two National Security employees, Roberta Jordan and Cathy Barnard, were recognized for promoting diversity in the workplace with the 2000 President's Diversity Awards.

Jordan received the Special Achievement Award for her active involvement in the community. She serves as vice president of the local chapter of the National Association for the Advancement of Colored People; as a mentor and supporter of the Providing a Trusting Hands Program (PATH) for Native American youth and serves as a point-of-contact for Historically Black Colleges and Universities Program. She also serves as the Community Service Chair for the National Management Association and this year she organized NMA's sponsorship of Santa for Seniors. "When I first moved to Idaho Falls, like others, I was quick to complain about what was lacking," said Jordan. "It took me awhile to realize that the only way things would change would be to get involved. It's my way of making a difference."

Barnard, a supervisor in Software and Electronics was recognized for her support of the Company EEO/AA program. Through hiring, promotion and mentoring, Barnard offers opportunities to employees to learn, grow and advance. "I've hired four women," says Barnard, "but I don't just hire them to meet goals. I look at people, what they are capable of and their strengths and weaknesses."



Dodd (continued from page 1)

an "outstanding" performance rating from DOE-Idaho for the six-month evaluation period ending in September. The entire Division contributed toward meeting the goals

that resulted in achieving the highest rating possible. Also noteworthy is the success that our information sciences staff had in winning a Bechtel Corporate Funded Research and Development Proposal for developing enhanced information tools

for project managers to use in the field.

My thanks again to Kathy Gatens for making the newsletter happen. She welcomes your contributions, comments and suggestions.



National Security Employee Patents

During the first quarter of this fiscal year, seven patent applications were reported submitted by National Security employees and program contributors. Congratulations to these employees on the remarkable and diverse work being conducted here at the INEEL.

A patent titled “Systems for Delivering Liquified Natural Gas to an Engine” was awarded to **Dennis N. Bingham**, Bruce M. Wilding, James E. O’Brien, Ali S. Siahpush and Kevin Brown. Software and Electronics employee, Dennis Bingham described the technology as a device to help speed up the process of pressurizing a tank. All fuel tanks require pressure to move the fuel from the tank to the engine. Automobiles use a small fuel pump. This device diverts a small amount of fuel from the engine, heats it and returns it to the vapor space in the fuel tank. The heated fuel increases pressure within the tank.

Informally called the “Eco-shunt”, the device takes advantage of already existing boiling characteristics of liquid natural gas as it passes through the vehicle’s vaporizer. Much like multiple small pumps can inflate a bicycle tire to high pressure, the boiling sends warm fuel back to the tank. Valves keep the fluid streams moving in the right directions.

According to Bingham, liquid natural gas, like other alternative fuels, suffer from a lack of infrastructure for users. The number of fuel stations available limit drivers wanting to switch to liquid natural gas. Additionally, different engines require varying fuel pressures for maximum efficiency. For example, a light duty truck engine may require 30 PSI while a large semi-truck may require 125 PSI. Fuel stations generally dispense fuel of one pressure.

This patented device can increase or decrease the pressure to efficiently match any fuel type to that required by the engine.

Steven Hartenstein, Paul Tremblay, Michael Fryer, Frederick Hohorst

“Method, System, and Apparatus for Monitoring and Adjusting the Quality of Indoor Air”

W. Thor Zollinger, Kerry B. Blinger, Charles B. Isom, **Scott G. Bauer**

“Anti-Static, Non-Sparking Coatings for Explosive Environments”

W. Thor Zollinger, Kerry B. Blinger, Charles B. Isom, **Scott G. Bauer**

“Ultrasonic Delays for Use in Explosive Environments”

John M. Svoboda, John L. Morrison

“Differential Capacitance Probe for Process Control Involving Aqueous Dielectric Fluids”

Stuart K. Janikowski, Mark D. Argyle, Robert V. Fox, Daniel M. Ginosaur, David Miller, C. A. Allen, A. Propp, and **William J. Toth**

“Method for Modifying Monofilaments, Bundles of Monofilaments, and High Strength Fibrous Material”

Stuart K. Janikowski, Mark D. Argyle, Robert V. Fox, Daniel M. Ginosaur, David Miller, C. A. Allen, A. Propp, and **William J. Toth**

“System Configured for Applying Multiple Modifying Agents to a Substrate.”

Stuart K. Janikowski, Mark D. Argyle, Robert V. Fox, Daniel M. Ginosaur, David Miller, C. A. Allen, A. Propp, and **William J. Toth**

“System Configured for Applying a Modifying Agent to a Non-Equidimensional Substrate.”

